

**WHAT IS CLAIMED:**

1. Personal care or household care composition comprising at least one cationic, oxidized polysaccharide or derivative thereof having a weight average molecular weight with a lower limit of 50,000 and an upper limit of 1,000,000, having aldehyde  
5 functionality content of at least 0.001 meq/gram of polysaccharide.
2. The personal care or household care compositions of claim 1, wherein the at least one cationic, oxidized polysaccharide or derivative thereof has a Brookfield viscosity at 10 wt % solids of the polysaccharide at 25°C of a lower limit of 30 cps and  
10 an upper limit of 2,000,000 cps.
3. The composition of claim 1 wherein the composition has a cationic degree of substitution (DS) lower limit of about 0.001 and an upper limit of about 3.0.
- 15 4. The composition of claim 3, wherein the cationic degree of substitution (DS) has a lower limit amount of 0.01.
5. The composition of claim 3, wherein the cationic degree of substitution (DS) has a lower limit amount of 0.05.  
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6. The composition of claim 3, wherein the cationic degree of substitution (DS) has a lower limit amount of 0.1.
7. The composition of claim 3, wherein the cationic degree of substitution  
25 (DS) has an upper limit of about 2.0.
8. The composition of claim 3, wherein the cationic degree of substitution (DS) has an upper limit of about 1.0.
- 30 9. The composition of claim 3, wherein the cationic degree of substitution (DS) has an upper limit of about 0.5.

10. The composition of claim 3, wherein the cationic degree of substitution (DS) has an upper limit of about 0.25

11. The composition of claim 1, wherein the derivative moiety on the cationic derivatized polysaccharide is selected from the group consisting of alkyl, hydroxyalkyl, alkylhydroxyalkyl, and carboxymethyl, wherein the alkyl has a carbon chain containing from 1 to 22 carbons and the hydroxyalkyl is selected from the group consisting of hydroxyethyl, hydroxypropyl, and hydroxybutyl.

12. The composition of claim 1, wherein the polysaccharide is selected from the group consisting of cellulose, starch, dextran, and polygalactomannan.

13. The composition of claim 12, wherein the polysaccharide is a polygalactomannan that is either guar or locust bean or derivatives thereof.

14. The composition of claim 12, wherein the polysaccharide is a cellulosic that is a cellulose ether derivative.

15. The composition of claim 1, wherein the cationic moiety is selected from quaternary ammonium compounds.

16. The composition of claim 15, wherein the quaternary ammonium compound is selected from the group consisting of 3-chloro-2-hydroxypropyltrimethylammonium chloride, 2,3-epoxy-propyltrimethylammonium chloride, 3-chloro-2-hydroxypropyltrimethylammonium bromide, 2,3-epoxy-propyltrimethylammonium bromide; glycidyltrimethylammonium chloride, glycidyltriethylammonium chloride, glycidyltripropylammonium chloride, glycidylethyldimethylammonium chloride, glycidyl-diethylmethylammonium chloride, and their corresponding bromides and iodides; 3-chloro-2-hydroxypropyltriethylammonium chloride, 3-chloro-2-hydroxypropyltripropylammonium chloride, 3-chloro-2-

hydroxypropylethyldimethylammonium chloride, and their corresponding bromides and iodides; and halides of imidazoline ring containing compounds.

- 5           17. The composition of claim 1, wherein the Mw has a lower limit of 50,000.
18. The composition of claim 1, wherein the Mw has a lower limit of 75,000.
19. The composition of claim 1, wherein the Mw has a lower limit of 100,000.
- 10          20. The composition of claim 1, wherein the Mw has an upper limit of 1,000,000.
21. The composition of claim 1, wherein the Mw has an upper limit of 600,000.
22. The composition of claim 1, wherein the Mw has an upper limit of 300,000.
- 15          23. The composition of claim 1, wherein the Mw has an upper limit of 150,000.
24. The composition of claim 2, wherein the lower limit of the Brookfield  
viscosity at 30 rpm of the polysaccharide is 50 cps.
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viscosity at 30 rpm of the polysaccharide is 100 cps.
26. The composition of claim 2, wherein the lower limit of the Brookfield  
25 viscosity at 30 rpm of the polysaccharide is 300 cps.
27. The composition of claim 2, wherein the upper limit of the Brookfield  
viscosity at 30 rpm of the polysaccharide is 10,000 cps.
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viscosity at 30 rpm of the polysaccharide is 5,000 cps.
29.     The composition of claim 2, wherein the upper limit of the Brookfield  
viscosity at 30 rpm of the polysaccharide is 2,000 cps.

30. The composition of claim 2, wherein the lower limit of the Brookfield viscosity at 0.3 rpm of the polysaccharide is 50,000 cps.

5 31. The composition of claim 2, wherein the lower limit of the Brookfield viscosity at 0.3 rpm of the polysaccharide is 100,000 cps.

32. The composition of claim 2, wherein the lower limit of the Brookfield viscosity at 0.3 rpm of the polysaccharide is 150,000 cps.

10 33. The composition of claim 2, wherein the upper limit of the Brookfield viscosity at 0.3 rpm of the polysaccharide is 1,000,000 cps.

34. The composition of claim 2, wherein the upper limit of the Brookfield  
15 viscosity at 0.3 rpm of the polysaccharide is 500,000 cps.

35. The composition of claim 2, wherein the upper limit of the Brookfield viscosity at 0.3 rpm of the polysaccharide is 250,000 cps.

20 36. The composition of claim 1, further comprising a member selected from the group consisting of colorant, preservative, antioxidant, alpha or beta hydroxy acid, activity enhancer, emulsifier, functional polymer, viscosifying agent, alcohol, fat or fatty compound, antimicrobial compound, anti-dandruff, volumizers, anti-static agents, moisturizers, styling-aids, zinc pyrithione, silicone material, hydrocarbon polymer,  
25 emollients, oil, surfactants, suspending agents, suncare agent and mixtures thereof.

37. The composition of claim 36, wherein the member is a functional polymer that is selected from the group consisting of anionic, hydrophobically-modified, and amphoteric acrylic acid copolymers, vinylpyrrolidone homopolymers and copolymers,  
30 cationic vinylpyrrolidone copolymers, nonionic, cationic, anionic, and amphoteric cellulosic polymers, acrylamide homopolymers, cationic, anionic, amphoteric, and hydrophobically-modified acrylamide copolymer, polyethylene glycol polymer and copolymer, hydrophobically-modified polyether, hydrophobically-modified

polyetheracetal, hydrophobically-modified polyetherurethane, an associative polymer, hydrophobically-modified cellulosic polymer, polyethyleneoxide-propylene oxide copolymer, chitosan, clay, and a nonionic, anionic, hydrophobically-modified, amphoteric, cationic polysaccharides, chitosan, starch, alginates, Konjack gum, clay, poloxamer (polyoxyethylene/polyoxypropylene block polymer), and mixtures thereof.

38. The composition of claim 36, wherein, the member is the nonionic, cationic, anionic, and amphoteric cellulosic polymers are selected from the group consisting of hydroxyethylcellulose, hydroxypropylcellulose, hydroxypropylmethylcellulose, carboxymethylcellulose, hydrophobically-modified carboxymethylcellulose, cationic hydroxyethylcellulose, cationic hydrophobically-modified hydroxyethyl cellulose, hydrophobically modified hydroxyethylcellulose, hydrophobically-modified hydroxypropylcellulose, cationic hydrophobically-modified hydroxypropyl cellulose, cationic carboxymethylhydroxyethylcellulose, and cationic hydroxypropylcellulose.

39. The composition of claim 36, wherein the member is the nonionic, anionic, hydrophobically modified, amphoteric, and cationic polygalactomannan selected from the group consisting of carboxymethyl guar, hydroxypropyl guar, hydrophobically-modified guar, carboxymethyl guar hydroxypropyltrimethylammonium chloride, guar hydroxypropyltrimethylammonium chloride, and hydroxypropyl guar hydroxypropyltrimethylammonium chloride, hydroxybutyl guar, hydroxybutyl guar hydroxypropyltrimethylammonium chloride, hydroxyethyl guar, hydroxyethyl guar hydroxypropyltrimethylammonium chloride, and locust bean.

40. The composition of claim 36, wherein the member is the viscosifying agent that is selected from the group consisting of NaCl, NH<sub>4</sub>Cl, KCl, and fatty alcohols, fatty acid esters, fatty acid amides, fatty alcohol polyethyleneglycol ethers, sorbitol polyethyleneglycol ethers, polyethyleneoxide fatty acid esters, ethyleneglycol monostearate or distearate, cocamidopropyl betaine, clays, silicas, cellulosic polymers, xanthan, alginates, guar and guar derivatives, carrageenan, Konjac flour, gelatin, dextrin, pectin, starch, and mixtures thereof.

41. The composition of claim 36, wherein the member is the silicone material that is selected from the group consisting of cyclosiloxane, linear siloxane, comb or graft siloxane structure with polyol, amino, quaternary ammonium, or other functional groups in the siloxane structure, and mixtures thereof.

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42. The composition of claim 41, wherein the member is the other functional groups that are selected from the group consisting of polyethylenoxy and/or polypropylenoxy groups optionally containing C<sub>6</sub>-C<sub>24</sub> alkyl groups, substituted or unsubstituted amine groups, thiol groups, alkoxylated groups, hydroxyl groups, acyloxyalkyl groups.

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43. The composition of claim 41, wherein the silicone material is selected from the group consisting of polyalkylsiloxanes, polyarylsiloxanes, polyalkylarylsiloxanes, and mixtures thereof.

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44. The composition of claim 43, wherein the member is the polyalkylsiloxane that is selected from the group consisting of polydimethylsiloxane, polydimethylsiloxane hydroxylated at the end of the chain, and mixtures thereof.

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45. The composition of claim 36, wherein the member is the surfactant that is anionic, cationic, amphoteric, or nonionic or a mixture thereof.

46. A process for producing the cationic, oxidized polysaccharide or derivative thereof of claim 1 comprising (a) reacting at least one cationic polysaccharide or cationic derivatized polysaccharide with at least one reagent that reduces the weight average molecular weight (Mw) of the polysaccharide or derivative thereof to an upper limit of 1,000,000 Dalton and (b) recovering the cationic, oxidized polysaccharide to produce the cationic, oxidized polysaccharide composition of claim 1.

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47. The process of claim 46, wherein the cationic polysaccharide or cationic derivatized polysaccharide is treated with the reagent in aqueous medium to produce an aqueous dispersion of the treated polysaccharide, to produce the composition of claim 1.

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48. The process of claim 46, wherein the reagent is an oxidizing reagent selected from the group consisting of peroxides, persulfates, permanganates, perchlorates, hypochlorite, oxygen, and biochemical oxidants.

5 49. The process of claim 46 wherein the oxidizing reagent is hydrogen peroxide.

50. The process of claim 48, wherein the oxidizing reagent is the biochemical oxidizing reagent that is an oxygenase.

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51. The process of claim 50, wherein the oxygenase is galactose oxidase.

52. The process of claim 48, wherein the reagent further comprises a hydrolytic reagent.

15 53. The process of claim 52, wherein said hydrolytic reagent is selected from the group consisting of hydrolytic enzymes.

54. The process of claim 53 wherein said hydrolytic enzyme is selected from the group consisting of hemicellulases.

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55. The process of claim 54, wherein the hemicellulase is mannanase.

56. The process of claim 52, wherein said hydrolytic reagent is an organic or mineral acid.

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57. The process of claim 46, wherein the cationic polysaccharide or cationic derivatived polysaccharide is a cellulose ether or a polygalactomannan.

58. The process of claim 57, wherein the cationic polysaccharide or cationic derivatived polysaccharide is a polygalactomannan selected from the group consisting of guar and guar derivative.

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59. The process of claim 57, wherein the cationic polysaccharide or cationic derivatized polysaccharide is a cellulose ether selected from the group consisting of cationic hydroxyethylcellulose (HEC), cationic hydrophobically modified hydroxyethylcellulose (HMHEC), cationic hydroxypropylmethylcellulose (HPMC), cationic hydroxypropylcellulose (HPC), cationic ethylhydroxyethylcellulose (EHEC), cationic methylhydroxyethylcellulose (MHEC), and cationic methylcellulose (MC), and mixtures thereof.

60. The process of claim 46 further comprising the addition of sodium metabisulfite, sodium bisulfite, sodium hypochlorite or sodium chlorite.

61. The process of claim 47, further comprising recovering the derivatized polysaccharide in dry form from the aqueous solution.

62. The process of claim 58, wherein the cationic polygalactomannan or cationic derivatized polygalactomannan is in the form of powder, flour, or splits.

63. A composition for conditioning surfaces comprising the composition of claim 1, and the surfaces are selected from the group consisting of skin, hair, protein, polyester, cellulose, paper, and textile substrates.

64. The composition of claim 1 is a household care composition that further comprising at least one other active household ingredient.

65. The household care composition of claim 64, wherein the active household ingredient is selected from the group consisting of insect repellent agent, pet deodorizer agent, pet shampoo active, industrial grade bar and liquid soap active, dishwashing soap active, all purpose cleaner, disinfecting agent, grass and plant feeding agents, water treatment agent, rug and upholstery cleaning active, laundry softener active, laundry detergent active, toilet bowl cleaning agent, fabric sizing agent, dust collection agent, antiredeposition agent, textile cleaning agent, softening, antistatic, and lubricating agent.



66. The household care composition of claim 64, wherein the composition also includes at least one additional ingredient selected from the group consisting of colorant, preservative, antioxidant, bleaching agent, activity enhancer, emulsifier, functional polymer, viscosifying agent, alcohol, fat or fatty compound, oil, surfactant, fragrance, suspending agent, silicone material, and mixtures thereof.

67. The composition of claim 1 is a personal care composition further comprising at least one other active personal care ingredient.

68. The personal care composition of claim 67, wherein the active personal care ingredient is selected from the group consisting of perfumes, skin coolants, emollients, moisturizer, deodorants, antiperspirants actives, moisturizing agents, cleansing agents, sunscreen actives, hair treatment agents, oral care agents, denture adhesive agents, shaving actives, beauty aids, and nail care active.

69. The personal care composition of claim 67, wherein the composition is a product selected from the group consisting of hair care, skin care, sun care, nail care, and oral care.

70. The composition of claim 69, wherein the product is a hair care product comprising a conditioning agent selected from the group consisting of silicone materials, hydrocarbon oils, panthenol and derivatives thereof, pantothenic acid and derivatives thereof, and mixtures thereof.

71. The composition of claim 69, wherein the product is a skin care product comprising a conditioning agent selected from the group of consisting of silicone materials, hydrocarbon oils, panthenol and derivatives thereof, pantothenic acid and derivatives thereof, and mixtures thereof.

72. The composition of claim 71, wherein the skin care product comprises a emollient agent selected from the group of consisting of polyhydric alcohols and hydrocarbons.

73. The composition of claim 69, wherein the product is the hair care product or skin care product that comprises up to 99 % by weight based on the total composition of the cationic, oxidized polysaccharide or derivative thereof of claim 1.

5 74. The personal care composition of claim 67, wherein the composition also includes at least one additional ingredient selected from the group consisting of colorant, preservative, antioxidant, alpha or beta hydroxy acid, activity enhancer, emulsifier, functional polymer, viscosifying agent, alcohol, fat or fatty compound, antimicrobial compound, zinc pyrithione, silicone material, anti-dandruff, hydrocarbon polymer,  
10 emollient, oil, surfactant, flavor, fragrance, medicaments, rejuvenating agents, suspending agents, stabilizing biocides, and mixture thereof.

75. The composition of claim 1, further comprising water in an amount of 1 to 99 % by weight of the total composition.

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76. A method of making a personal care or household care composition comprising adding as an ingredient to the composition a cationic, oxidized polysaccharide or derivative thereof that is prepared by treating the polysaccharide with an oxidizing reagent that introduces aldehyde functionality and reduces molecular  
20 weight.